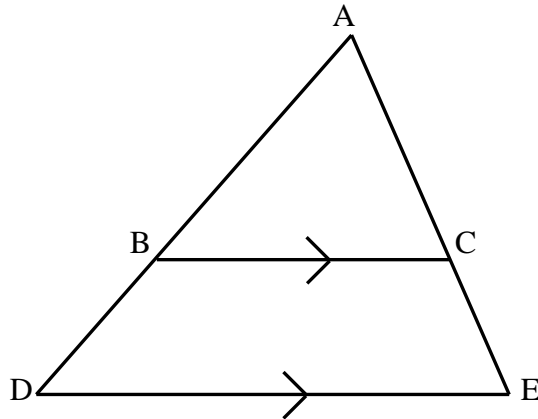


**National 5**

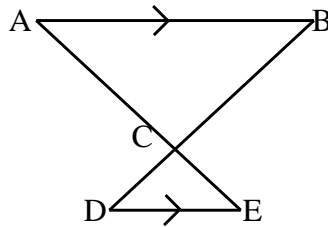
**Homework RE15**

1.  $BC = 8\text{cm}$ ,  $DE = 12\text{cm}$  and  $AB = 9\text{cm}$ .

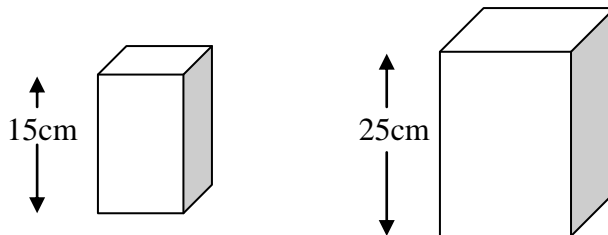
- (a) Calculate the length of  $BD$ .
- (b) Triangle  $ABC$  has area  $44\text{ sq cm}$ .  
Find the area of triangle  $ADE$ .



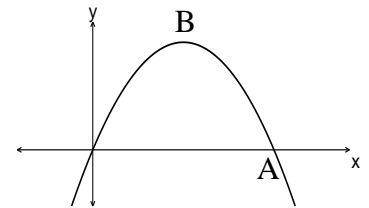
2.  $AB = 20$ ,  $DE = 8$  and  $AC = 15$ .  
Calculate the length of  $CE$ .



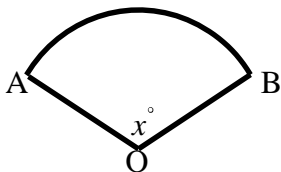
3. The volume of the small container is  $2.7$  litres.  
Find the volume of the large container if they are mathematically similar.



4. Part of the graph of the parabola  $y = 6x - 3x^2$  is shown below.  
Find the coordinates of A and B and the equation of the axis of symmetry.



5. Arc length  $AB$  is  $12.1\text{ cm}$  and the radius is  $5\text{ cm}$ .  
Calculate the area of sector  $AOB$ .



6. Simplify:

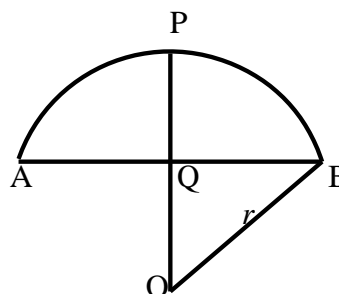
(a)  $\frac{1}{x} + \frac{1}{x^2}$  ( $x \neq 0$ )      (b)  $\frac{x^2 - 9}{2x + 6}$  ( $x \neq -3$ )      (c)  $\frac{1}{a} - \frac{1}{a+1}$  ( $a \neq 0, -1$ ).

7. The travelling expenses claimed by a salesperson depend on the engine capacity of the car and the number of miles travelled per week, as shown in the table below.

ENGINE CAPACITY	EXPENSES PER MILE
less than or equal to 1 litre	£0.25 for <b>each</b> of the first 250 miles travelled
greater than 1 litre but less than or equal to 1.2 litres	£0.27 for <b>each</b> of the first 250 miles travelled
greater than 1.2 litres	£0.29 for <b>each</b> of the first 250 miles travelled
Where the number of miles travelled in a week is <b>greater than 250</b> , £0.15 can be claimed for <b>each additional</b> mile.	

- (a) Find the expenses claimed by a salesperson in a week when 550 miles are travelled and the engine capacity is 1.6 litres.
- (b) Write down a formula to find the expenses £E, claimed for  $t$  miles travelled, where  $t$  is greater than 250, and the engine capacity is 1.6 litres.

8.  $AB = 10$  units,  $PQ = 2$  units.  
Find the value of  $r$ , the radius of the circle.



9. Consecutive cubic numbers can be added using the following pattern:

$$1^3 + 2^3 = \frac{2^2 \times 3^2}{4}$$

$$1^3 + 2^3 + 3^3 = \frac{3^2 \times 4^2}{4}$$

$$1^3 + 2^3 + 3^3 + 4^3 = \frac{4^2 \times 5^2}{4}$$

- (a) Express  $1^3 + 2^3 + 3^3 + 4^3 + 5^3 + 6^3 + 7^3$  in the same way.
- (b) Write down an expression for the sum of the first  $n$  cubic numbers.

10. Simplify (a)  $\sqrt{32} + 2\sqrt{2} - \sqrt{50}$  (b)  $\sqrt{2} \sqrt{6} - \sqrt{2}$

11. Find, algebraically, the coordinates of the point of intersection of the straight lines with equations  $3x + 2y = 4$  and  $y = 2x - 5$ .

12. Cooking oil is sold in 1 litre bottles, filled from a cylindrical tank of radius 1.3 m and height 2.1 m. How many bottles can be filled from the vat if it is full of cooking oil?  
Answer to the nearest hundred.